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CANADA/NOVA SCOTIA AGREEMENT

RESPECTING AN ACID RAIN REDUCTION PROGRAM

NOVA SCOTIA 1991 ANNUAL REPORT

Nova Scotia Department of the Environment

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1.0 INTRODUCTION

The following report was prepared to fulfil an obligation under the Canada/Nova Scotia Agreement respecting an Acid Rain Reduction Program to make public on an annual basis, information on progress achieved in realizing Nova Scotia's SO_2 emission target. Included in this report are 1991 SO_2 emissions data by source, information on control initiatives, monitoring effort and future program related activity.

2.0 NOVA SCOTIA'S COMMITMENT

In February 1985 the federal Minister of Environment and the Ministers of Environment for Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Newfoundland and Nova Scotia committed to a provincially apportioned SO_2 reduction plan. Under this plan the seven provinces agreed to specific emission targets in order to realize an initial total emission level for eastern Canada of 2,619,000 tonnes. In a federal/provincial agreement signed in 1988, Nova Scotia formalized its commitment to have measures in place by the end of 1994 to achieve its apportioned target of 204,000 tonnes.

At the time the reduction program was developed, Ministers further agreed to subsequently pursue additional reductions to achieve an overall emission total for eastern Canada of 2.3 million tonnes. In support of this objective Nova Scotia has recently agreed to a further 15,000 tonne reduction in its target, thereby establishing its annual SO_2 emission objective as 189,000 tonnes beginning in 1995.

3.0 SO_2 EMISSION CONTROL

Power generation accounts for the largest single source of SO_2 emissions in the Province (Table 1). Consequently, an allocation of a portion of the total provincial emissions target against thermal power generating facilities has constituted an important component of the province's SO_2 emission control strategy. The current emission target set for power generation is 145,000 tonnes by the year 1995.

By adopting what is referred to as a "Bubble" approach for the control of power generation related S02 emissions NSDOE enabled Nova Scotia Power to apply a least cost flexible approach to emission control while still meeting a specified total annual emission target.

Monitoring to track Nova Scotia Power's progress in meeting this target is accomplished through permit requirements issued under the Environmental Protection Act which require the annual reporting of plant SO_2 emission totals. Similar reporting requirements have been established for both pulp mills and refineries in the province.

Such permits are further utilized to establish specific plant related SO_2 ambient air monitoring requirements to ensure that provincial ambient air quality objectives are realized in the vicinity of each generating facility.

Finally, all major new industrial facilities and power generation plants in the province, are subject to review under the Environmental Assessment Act. This in turn allows for a full evaluation of potential annual SO_2 emissions associated with these projects within the larger context of the total provincial target.

4.0 CURRENT EMISSION ESTIMATES

A survey of major sources of SO_2 emissions is presented in Table 1. Estimates were based on emissions data obtained for major point sources, as well as fuel consumption data for other source categories such as industrial and commercial boilers compiled by the Nova Scotia Department of Natural Resources.

As indicated in Table 1, total SO_2 emissions for 1991 were estimated to be 173.8 kilotonnes representing a reduction of close to 4 kilotonnes from the previous year.

Table 1: SULPHUR DIOXIDE EMISSIONS (tonnes/year)

SECTOR	1980 (Base Year)	1989	1990	1991
N.S.P.C.				
Glace Bay		7750.3	4273.2	3005.6
Lingan		82455.8	75810.3	82469.4
Maccan		372.9	724.3	484.4
Pt. Tupper		21217.0	20740.4	18526.0
Trenton		13647.8	17224.0	18369.5
Tufts Cove		21034.8	24469.5	18181.0
THERMAL POWER FUEL COMBUSTION	---------	146478.6	143241.7	141036.9
OTHER STATIONARY FUEL COMBUSTION	---------	14000	15000	15450
PROCESS EMISSIONS	---------			
Oil & Gas Refining		10400	7260	5300
Pulp Industry		6100	5400	4500
Other		3900	4600	5500
TRANSPORTATION	---------	1950	2000	2040
TOTAL EMISSIONS	193,000*	182,828	177,500	173,826

*Revised from previous annual reports to reflect improved emission estimates compiled by Environment Canada and reported in Report RPSS/AP/3 March 1990.

4.1 Thermal Electric Power Generation

Emission estimates for 1991 (Table 1) show that power generation produced an estimated 141,036 tonnes of SO_2, approximately 80 percent of the SO_2 emissions for Nova Scotia. To meet the new SO_2 emission objective for Nova Scotia of 189,000 tonnes, Nova Scotia Power has been required to limit its total SO_2 emissions after 1994 to 145,000 tonnes, representing a 15,000 tonne reduction from their original limit of 160,000 tonnes.

In order to control atmospheric emissions of SO_2, Nova Scotia Power has embarked upon a long range environmental protection program designed to cut their annual sulphur dioxide emissions to less than 90 kilotonnes by the year 2010. The principal components of this environmental program include:

- completion of the world's largest circulating fluidized bed combustor at Point Aconi - designed to achieve the removal of 90 percent of the potential SO_2 emissions.
- utilization of higher sulphur content coal at Point Aconi where sulphur removal efficiency is the highest, thereby allowing for the use of lower sulphur coals to form the blended fuels supplied to other existing power plants.
- introduction of lower sulphur fuel oil at the Tufts Cove Generating Station (initiated in 1990).
- utilization of low sulphur coal at the Trenton generating station units No. 5 and No. 6.
- an expanded program of demand management to promote the efficient use of electricity.
- Testing and application of emerging emission control technologies. In this regard Nova Scotia Power is developing plans this year to proceed with a demonstration facility at Point Tupper using sorbent injection for the reduction of SO_2 emissions.

4.2 Pulp Industry

Process emissions from the pulp and paper industry in Nova Scotia contributed 4500 tonnes to the provinces annual sulphur dioxide emission levels.

The majority of these SO_2 emissions originate from the Stora Forest Industries Limited pulp mill in Port Hawkesbury due to the nature of their sulphite pulping process which incorporates a liquor recovery boiler. In comparison, the Bowater Mersey pulp mill generates minimal SO_2 process emissions due to the mechanical pulping process implemented in 1990.

4.3 Petroleum Refineries

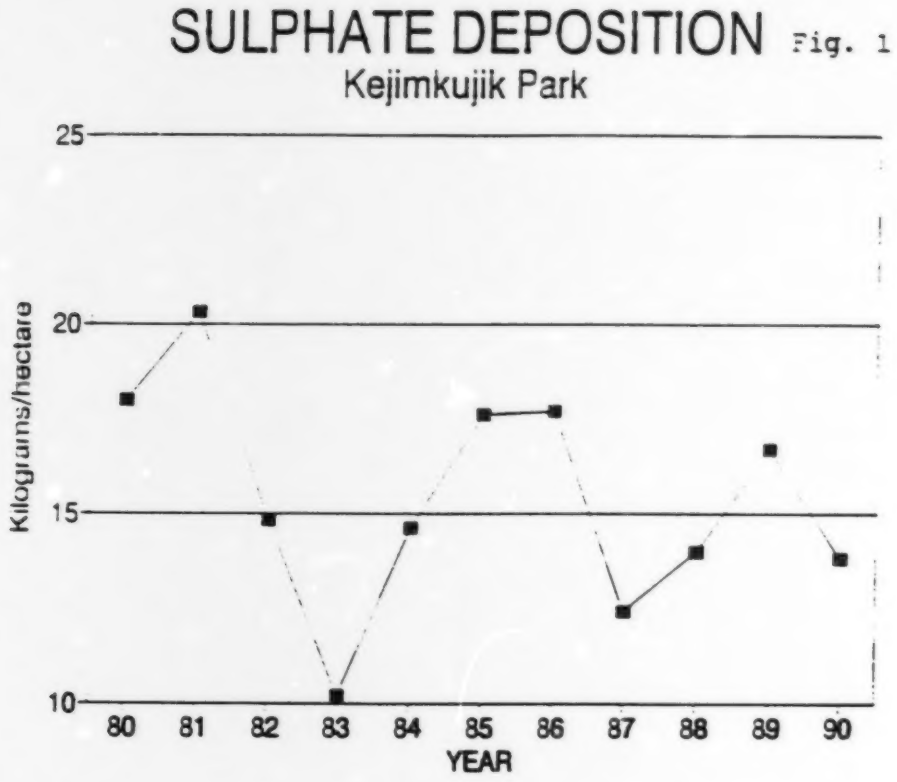
Ultramar and Imperial Oil both operate refineries in Dartmouth, Nova Scotia; in addition a re-refinery operated by Inland Re-refinery Co. Ltd. is situated in Debert.

The Imperial Oil refinery has the largest production capacity in the Province and contributes approximately 70% of the total SO_2 emissions originating from this source category. Although SO_2 emissions from the two refineries fluctuate, depending on the availability of low sulphur (sweat) crude oil, it is anticipated that this sector will maintain sulphur dioxide emissions at close to current levels.

5.0 ACID DEPOSITION

Department of the Environment acid precipitation collectors were operated in 1991 at the Collingwood Fish Culture Station and the East River, St. Mary's station. In addition to these, the Atmospheric Environment Service (AES) of Environment Canada operate two additional monitoring stations at Kejimkujik National Park and Jackson.

Sulphate deposition calculations for the period 1980 - 1990 at the Kejimkujik Park Station are provided in figure 1., as an indication of the long term deposition trend in the Province. These monitoring data suggest a dampening oscillation in deposition within an overall downward trend in the level of sulphate deposition being received by the Province. Continued monitoring will be required, however, to determine whether existing acid reduction programs both in Canada and the United States are sufficient to reduce deposition to the 8 kilogram/hectare sulphate loading levels considered necessary to ensure adequate protection for much of Nova Scotia's freshwater systems.



6.0 FUTURE INITIATIVES

In the coming year it is anticipated that Nova Scotia will undertake negotiations with the federal government to formally acknowledge its commitment through a new Acid Rain Agreement to accept an SO_2 emissions target of 189,000 tonnes by 1995. This will represent a 15,000 tonne reduction from the limit currently set out in the existing agreement.

In addition, the Nova Scotia Department of the Environment plans to further efforts to improve emission estimates in non-power generation sectors, with a focus on industrial and commercial boilers and industrial process emissions other than Pulp and Paper Mills and Refineries. These improved inventories are needed to ensure that Nova Scotia will be able to meet its reduction commitments under a renewed agreement.

Finally, plans are underway to establish a third provincial acid rain monitoring station on Cape Breton Island in order to better define sulphate deposition trends throughout the Province.